

1 TO WHOM IT MAY CONCERN:

2

3 BE IT KNOWN THAT I, OLIVER JOEN-AN MA, a  
4 citizen of the United States of America, residing in  
5 Arcadia, in the County of Los Angeles, State of  
6 California, have invented a new and useful improvement  
7 in

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9 LIGHT PROVIDING APPARATUS ATTACHABLE

10 TO UMBRELLA AND STAND ASSEMBLY

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1                                   **BACKGROUND OF THE INVENTION**

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3                   This invention relates generally to light  
4   transmission from an umbrella and stand locations, and  
5   more particularly to apparatus attachable to an  
6   umbrella stand to achieve such illumination.

7                   It is a common practice for ordinary people  
8   to use a garden umbrella in various outdoor  
9   resting/dining areas as a means to shade sunlight or to  
10  block rain drops when spending their leisure time  
11  outdoors. Hence, in this way a comfortable and  
12  relaxing environment can be provided. At present,  
13  since there is no lighting device specifically designed  
14  to be used with a garden umbrella when the surrounding  
15  lighting condition becomes dim, and people tend to  
16  improvise by attaching a corded lighting device to the  
17  umbrella to provide sufficient lighting to adjacent  
18  area. Nevertheless, although this type of lighting  
19  device is readily available, the disadvantages for  
20  using a corded lighting device in this way often poses  
21  a hazardous situation to people moving around in this  
22  area, because of the dangling electrical cord; and  
23  further the hanging electrical cord gives an  
24  undesirable contrast to the nature background which can  
25  easily ruin the relaxing atmosphere.

1           There is also need at umbrella and stand  
2 locations, such as patios, for controlled illumination,  
3 associated with selected individual umbrella locations,  
4 instead of general illumination of the entire area. It  
5 appears that no way was previously known to achieve  
6 these objectives in the novel and unusual manner, and  
7 with unusual results, as are now provided by the  
8 present invention.

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10                           **SUMMARY OF THE INVENTION**

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12           It is a major object of the invention to  
13 provide apparatus and method to meet the above need.  
14 Basically, the invention is embodied in a light  
15 provider for an umbrella and stand assembly, and that  
16 comprises:

17                   a)   a body releasably attachable to the  
18 assembly,

19                   b)   a source or sources of electric light  
20 carried by the body, to direct such light away from the  
21 body,

22                   c)   and incident light responsive means on  
23 the body to provide electrical energization for the  
24 light source, said means configured to receive incident

1 light from a direction or directions spaced away from  
2 light directed from said source or sources.

3 As will appear, the carrier body  
4 advantageously includes multiple sections that become  
5 interconnected when the body is attached to the  
6 assembly stand, whereby quick mounting or de-mounting  
7 of the light provider is made possible.

8 It is an objective of the present invention  
9 to solve all technical issues to meet the need for the  
10 referenced need by providing a portable, multi-purpose  
11 lighting device which can be easily fastened to , as  
12 well as un-fastened from, a pole-like object such as an  
13 umbrella stand, and without the trouble of having an  
14 electrical cord hanging undesirably from it.

15 The present invention achieves desired  
16 objectives by providing a multi-purpose lighting device  
17 comprising a plurality of base parts, preferably a  
18 lighting means integrated to each base part, and a  
19 power supply part. The present invention in one form  
20 is characterized by two structurally divided base parts  
21 A and B, each having a semi-circularly curved inner  
22 sidewall surface facing that of the other and in which  
23 a circular through hole is formed when the two base  
24 parts A and B are joined together. The present  
25 invention is further characterized by having a solar  
26 power charging part and a grip locking means for

1 gripping to a pole-like structure when said two base  
2 parts are coupled together while regulating gripping  
3 tension at the same time.

4 Another object is to provide the incident  
5 light responsive means in the form of a solar cell or  
6 cells, and said light source or sources comprise an LED  
7 or LEDs. The LEDs may be provided in clusters received  
8 in light reflecting receptacles, for producing  
9 concentrated light beams, the intensity and/or color of  
10 which may be controlled.

11 Another object includes provision of a  
12 carrier body central opening to receive the umbrella  
13 stand. The body may include multiple sections that  
14 become interconnected when said body is attached to the  
15 assembly stand. At least two sections may have hinged  
16 interconnection, whereby the sections are clampingly  
17 connected to the stand.

18 Additionally, a stand gripper or grippers may  
19 be provided at the central opening, and carried by the  
20 body; and the two body sections may respectively carry  
21 two grippers, with a spring or springs urging at least  
22 one gripper toward the other, to grip the stand  
23 therebetween. Stands of different diameters can  
24 thereby be gripped.

25 Latch elements may be carried by the body  
26 sections to latch together when the sections are closed

1 about an umbrella stand; and a latch release may be  
2 provided on one section. The construction enables  
3 inverting of the carrier body, to direct light upwardly  
4 or downwardly.

5 Typically, a grip locking means is provided  
6 to include a gripping claw, a sliding block, a crank  
7 handle, and a transmission part substantially connected  
8 to said crank handle; wherein, a slot is integrally  
9 formed inside each of the above-mentioned base part for  
10 slidably receiving said sliding block. Preferably, the  
11 grip locking means further comprises two threaded  
12 pillar parts substantially perpendicular to the  
13 coupling surface for rotatably driving said sliding  
14 block and transmission part. The gripping claw is  
15 securely coupled to the sliding block which enables  
16 inward or outward sliding movements of the gripping  
17 claw along longitudinal direction of said slot. Thus,  
18 gripping tension of said gripping claw can be suitably  
19 adjusted when gripping to a pole-like object by  
20 suitably adjusting the extension of said gripping claw  
21 protruding from the slot of said coupling surface.

22 The solar power charging part comprises a  
23 plurality of solar panels formed on a base part, and  
24 each solar panel is electrically connected to a solar-  
25 charging circuit part in the base part by means of  
26 wires.

1           The base part preferably includes a circular  
2 disk shape, wherein, a circular hole is formed through  
3 the center of the base part by having two structurally  
4 divided base parts A and B, combined together having a  
5 symmetrical semi-circularly curved inner sidewall  
6 surface facing that of the other.

7           The two divided base parts A and B may be  
8 hinged together along corner edges while the other  
9 corner edges are bound together by means of a separable  
10 buckling part, preferably.

11           The transmission structure may comprise a  
12 larger first gear and a pair of smaller second gears  
13 both engaging said first gear. The first gear is  
14 mounted inside a gear box part by means of an axle part  
15 while the second gears drive a threaded pillar part.

16           The sliding block and the gripping claw may  
17 both be of rectangular shape. A curved gripping  
18 surface is formed on the gripping claw such that a  
19 gripping teeth profile is preferably formed on the  
20 curved gripping surface. Furthermore, a longitudinal  
21 extending recessing strip formed on each side wall of  
22 said slot slidably receives a corresponding  
23 longitudinal extending protruding strip formed on each  
24 side wall of the sliding block.

25           The lighting means is preferably a battery-  
26 powered high luminance LED lamp. Compared with the

1 prior lighting devices, the present invention has the  
2 advantage of comprising a locking means capable of  
3 regulating gripping tension of said gripping claw to  
4 achieve firm grip to a pole-like object of different  
5 circumferential dimensions. Furthermore, the locking  
6 means is easy to be positioned, installed and  
7 uninstalled.

8           The present invention has another advantage  
9 of using a solar power charging part for charging a  
10 rechargeable battery directly which provides a safer  
11 and easier use of the device. Additionally, said  
12 rechargeable battery part is equipped with a corded  
13 charging unit, and the rechargeable battery is  
14 preferably concealed inside the base part.

15           These and other objects and advantages of the  
16 invention, as well as the details of an illustrative  
17 embodiment, will be more fully understood from the  
18 following specification and drawings, in which:

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20                           **DRAWING DESCRIPTION**

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22           Fig. 1 is an elevation view of light  
23 providing apparatus incorporating the invention,  
24 supported on an umbrella stand;



1           Fig. 2 is a view like Fig. 1, but showing the  
2   apparatus of Fig. 1 in inverted position;

3           Fig. 3 is an enlarged, top plan view of the  
4   Fig. 1 apparatus;

5           Fig. 4 is an elevation view taken on lines 4-  
6   4 of Fig. 3;

7           Fig. 5 is an enlarged, bottom plan view of  
8   the Fig. 1 apparatus;

9           Fig. 6 is a fragmentary view showing the  
10   apparatus in disconnected condition, with latch guide  
11   elements protruding;

12           Fig. 7 is an elevation taken on lines 7-7 of  
13   Fig. 6;

14           Fig. 8 is a view like Fig. 7, but showing the  
15   latch elements in connected condition;

16           Fig. 9 is an elevation view taken on lines 9-  
17   9 of Fig. 7, showing female latching elements;

18           Fig. 10 is an elevation view taken on lines  
19   10-10 of Fig. 7, showing male latch elements;

20           Fig. 11 is a fragmentary plan view showing  
21   umbrella stand grippers, engaging a stand of lesser  
22   diameter;

23           Fig. 12 is a view like Fig. 11, showing the  
24   grippers engaging a stand of relatively larger  
25   diameter;

26           Fig. 13 is a circuit schematic;



1 stand may or may not have an upper section 11a which  
2 can be tilted, at joint 14. An optional table is  
3 indicated at 13.

4 In accordance with the invention, a preferred  
5 light provider or fixture 15 is installed in supported  
6 position on the stand section 11b. In Fig. 1, light  
7 beams 15a are directed downwardly, away from body 16 of  
8 the light provided; and in Fig. 2, light beams 15b are  
9 directed upwardly away from the inverted body 16. A  
10 source or sources 18 of projected light are carried by  
11 the body 16, and may comprise clusters 18a of LEDs, as  
12 shown in Fig. 5. Such clusters are spaced about the  
13 stand axis 20; and each cluster may comprise between 2  
14 and 8 LEDs, as shown. Receptacle shaped reflectors 21  
15 re-direct light rays from the LED clusters downwardly  
16 in Fig. 1, and upwardly in Fig. 2. See also Fig. 14.  
17 The LEDs are protectively received in the receptacles  
18 which are sunk into the body 16, from surface 16a.  
19 Concentrated beams are produced by the multiple  
20 clustered LEDs.

21 Figs. 3 and 4 show one form of incident light  
22 responsive means on the body to provide for electrical  
23 energization of the light source or sources 18. That  
24 light responsive means is typically configured to  
25 receive incident light from a direction or directions  
26 22a in Fig. 1, and 22b in Fig. 2, spaced away from

1 light beams 15 and 15b from the source or sources.  
2 Such incident light is typically ambient daytime light.  
3 Fig. 13 shows ambient light rays 22a or 22b incident  
4 upon a solar cell or cells 26. The latter generate  
5 electricity transmitted as by circuit 27 to the LED  
6 light sources 18. A dry cell battery or batteries 29  
7 may be incorporated in circuit 27 to store electricity  
8 generated by cell or cells 26 as during daytime; and a  
9 control switch 30 may be operated to cause circuit 27  
10 to deliver electricity from the battery or batteries to  
11 the LEDs. Elements 18, 26, 27, and 29 are carried on,  
12 within, or by invertible body 16. As shown in Fig. 13,  
13 solar cells 26 have upwardly facing inlets 26a, at  
14 upper side 16c of body 16; and LEDs 18 generate light  
15 rays that are transmitted downwardly and away from the  
16 lower side 16d of body 16, as in Fig. 1. Fig. 4 shows  
17 a receptacle 90 on the body to receive AC current, to  
18 energize the LEDs, if desired.

19 See also Figs. 3 and 4 showing multiple solar  
20 cells 26 spaced clockwise about the body or stand  
21 central upright axis 20; and also see Fig. 5 showing  
22 the LED clusters 18a and reflectors 21 spaced clockwise  
23 about the axis 20, for concentrating the LED light in  
24 beams transmitted from the reflectors.

25 Also shown in Fig. 13 is a remote control  
26 means 80, connected as by wiring 81 (or a radio link)

1 with circuit 27, for controlling the intensity and/or  
2 color of light transmission from the LED or LEDS.  
3 Switch 30 enables switching power to lights 18 from  
4 solar cell energization, to battery power energization  
5 to household AC energization.

6            Preferably, the body 16 is comprised of two  
7 sections, as shown at 16e and 16f in Figs. 3-7. Those  
8 sections may have semicircular peripheries, as at 36  
9 and 37, and flat sides 36a and 37a that interface when  
10 the body sections are closed together about the stand,  
11 as enabled by hinge connection of the bodies as at 40.  
12 When the sections are closed together, the stand  
13 becomes attached or clamped to the stand frictionally,  
14 in such manner as to allow quick release, or adjustment  
15 of the body 16 along the stand, or removal from the  
16 stand, or inverting of the body and attachment to the  
17 stand or pole as in Fig. 2.

18            As shown in Figs. 5, 11 and 12, grippers 50  
19 and 51 are carried by the body sections to grip the  
20 stand, when the sections are closed together. The  
21 grippers may have serrated edges as at 50a and 51a to  
22 frictionally grip or clamp the stand. Compression  
23 springs 52 and 53 urge the grippers toward the stand,  
24 the grippers being slidable in recesses 54 and 55 in  
25 the body sections. This also accommodates stands of

1 different diameters, as in Figs. 11 and 12, to which  
2 the device may be readily attached.

3 Figs. 6-10 show the provision of a latch or  
4 latches 60 protruding from section 16e and receivable  
5 in slots 61 formed in body section 16f, as the two  
6 sections close together. Fig. 7 shows that latches 60  
7 are carried on a plunger 62 movable in a guide groove  
8 or grooves 63 and 64, parallel to axis 20. When the  
9 sections are closed together, latches 60 are cammed  
10 downwardly at keeper shoulders 65 and 66, the plunger  
11 62 then downwardly compressing a spring 67. Upon full  
12 closure of sections 16e and 16f, the latches hook into  
13 keeper recesses 68 and 69. A protruding release button  
14 70 is manually operable upon being pushed, to move the  
15 plunger and latches downwardly, allowing their removal  
16 from recesses 68 and 69, and spreading apart of the  
17 body sections 16e and 16f, to release the carrier body  
18 from the stand. A guide protrusion 85 may be provided  
19 on section 16f, to fit into guide recess 86 in section  
20 16e to assist in orienting the sections 16e and 16f  
21 during closure.

22 Body sections 16e and 16f have cover plates  
23 16e' and 16f' which may be upwardly convex or domed.

24 As shown in Fig. 15, another form of the  
25 present invention seen at 99 comprises a base part 101,

1 a lighting means 102, a locking means 103, and a solar  
2 power charging part 104. See also solar windows 104a.  
3 Furthermore, the base part 101 is preferably of  
4 circular disk shape comprising a symmetrically divided  
5 first base part 111 and a second base part 112 each  
6 having a semi-circularly curved inner sidewall surfaces  
7 115 and 116 facing that of the other in which (when 111  
8 and 112 are closed together) a circular through hole  
9 119 is formed to substantially encircle a pole-like  
10 object 200 when said two base parts 111 and 112 are  
11 jointly bound together. See Fig. 18. The two base  
12 parts 111 and 112 are connected together by means of a  
13 hinge part 113 along a corner edge of each base part  
14 while the other corner edges are coupled together by  
15 means of a separable binding part 114 for ease of  
16 binding and un-binding. A perpendicular slot 117  
17 extending inwardly through each of the inner sidewall  
18 surfaces 115 and 116, to slidably receive a locking  
19 means 103 for gripping to a pole-like object of  
20 different circumferential dimensions.

21 Preferably, the lighting means 102 of the  
22 present invention comprises a plurality of high  
23 luminance LED lamps evenly distributed on the base part  
24 101, to which the electrical power of each LED lamps is  
25 supplied by a rechargeable battery 143 seen in Fig. 18.

1 Each rechargeable battery 143 is concealed in a  
2 corresponding battery holder in the base part 101.

3 Typically, the rechargeable battery 143 is  
4 recharged with a corded charging unit. It is a feature  
5 of the present invention to use a solar power charging  
6 part 104 for charging a rechargeable battery directly.  
7 That solar power charging part 104 comprises a  
8 plurality of solar panels 142 formed on the base part  
9 101, and each solar panel is electrically connected in  
10 series to a solar-charging circuit part 141 in the base  
11 part by means of wires 144. The solar panels 142  
12 collect solar energy to be converted by the solar-  
13 charging circuit part 141 to electrical energy for  
14 supplying power to the rechargeable battery 143. Each  
15 solar panel 142 is inserted and bonded inside a recess  
16 118 of the base part 101 as shown in Fig. 2.

17 Referring to Fig. 2, said locking means 103  
18 is preferably fixed inside the perpendicular slot 117  
19 of the base part 101 for gripping to a pole-like object  
20 of different circumferential dimensions. The locking  
21 means 103 further comprises a gripping claw 138, a  
22 sliding block 137, a crank handle 131, a plurality of  
23 threaded pillar parts 136, and a transmission part.  
24 The transmission part preferably comprises a gear  
25 mounting part 132, a larger first gear 133, a pair of  
26 smaller second gears 134 both engaging said first gear



1 133, and an axle part 135. The gear mounting part 132  
2 may be fixed to the base part 101 by means of screws.  
3 The first gear 133 is rotatably fixed to the gear  
4 mounting part 132 by means of the axle part 135, while  
5 the second gears 134 drive the threaded pillar part  
6 136. An open end of the axle part 135 is coupled to  
7 the crank handle 131. The perpendicular slot 117 is  
8 integrally formed inside each of the first and second  
9 base parts 111 and 113 for slidably receiving sliding  
10 block 137. Typically, the two threaded pillar parts  
11 136 rotatably drive sliding block 137.

12           As seen in Fig. 21, a longitudinal extending  
13 recessing strip 172 formed on each side wall 171 of the  
14 perpendicular slot 117 slidably receives a  
15 corresponding longitudinal extending protruding rail  
16 372 formed on each side wall of the sliding block 137.  
17 Sliding block 137 further comprises a plurality of  
18 threaded through holes 371 (see Fig. 16) which  
19 preferably are two in number in this embodiment. Each  
20 threaded through hole 371 receives a threaded pillar  
21 part 136 by means of such thread. Second gears 134  
22 enable inward or outward sliding movements of the  
23 sliding block 137 along the longitudinal direction of  
24 the perpendicular slot 117 through rotation of the  
25 threaded pillar parts 136. The gripping claw 138 is  
26 securely coupled to the sliding block 137 by means of

1 screws. Typically, the sliding block 137 and the  
2 gripping claw 138 are both of rectangular shape.

3           A concavely curved gripping surface is formed  
4 on the gripping claw 138 such that a curved gripping  
5 teeth profile 381 is preferably formed on the curved  
6 gripping surface. The gripping claw 148 is securely  
7 coupled to the sliding block 137 which slides along the  
8 longitudinal direction of 117 which extends normal to  
9 the device axis. Thus, gripping tension of said  
10 gripping claw can be suitably adjusted when gripping to  
11 a pole-like object by suitably adjusting the extension  
12 of said gripping claw 148 protruding from the  
13 perpendicular slot 117 of said coupling surface.

14           Fig. 20 shows the device 99 attached to stand  
15 200 supporting umbrella 98. Fig. 22 shows a modified  
16 device 199, like 99, but upwardly domed at 198 so that  
17 light receiving windows 197 are angled to efficiently  
18 receive light from under the edges of the umbrella.

19           Although the present invention has been  
20 explained by the embodiments shown in the drawings  
21 described above, it should be understood to the  
22 ordinary skilled person the art that the invention is  
23 not limited to the embodiments, but rather that various  
24 changes or modifications thereof are possible without  
25 departing from the spirit of the invention.  
26 Accordingly, the scope of the invention shall be

1 determined only by the appended claims and their  
2 equivalents.

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